TREATMENT OF ALUMINUM-BASED SPENT NUCLEAR FUEL

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SUBPROJECT TEAM:

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ISSUE:

- EM's baseline for preparation of aluminum-based SNF for repository disposal has been Melt & Dilute treatment (August 2000 ROD)

- Development work on Melt & Dilute was suspended in December 2001 as a result of questions on the need for special treatment

- EM needs to make a decision on the path forward for disposition of aluminum-based SNF

- The Savannah River Site Performance Management Plan identified options for evaluation: Melt & Dilute, Direct Co-Disposal, and Chemical Processing

APPROACH:

- Determine if treatment (i.e., Melt & Dilute or Chemical Processing) is required
- Determine if treatment would be beneficial, even if not required
- Evaluate disposition alternatives
- Recommend path forward

TREATMENT ALTERNATIVES:

- Melt & Dilute
- Chemical Processing

PACKAGING ALTERNATIVES:

- Direct Disposal in Standardized Canisters
- Direct Disposal Bare (Uncanistered)

CONCLUSIONS:

- Treatment is not necessary
- Chemical separation is not cost effective compared to other alternatives
- Melt & Dilute is beneficial in that:
  - It reduces the volume of SNF to be disposed by about a factor of three thereby reducing cost of storage, transportation and disposal
  - It allows HEU to be reduced to LEU thereby reducing safeguards and security issues
  - It allows for relatively easy characterization of the material to be disposed

CONCLUSIONS (Continued)

However, these benefits are not sufficient to lead to selection of Melt & Dilute as the alternative of choice:

- the cost savings over Direct Disposal is offset by the increased operations costs
- resolution of S&S issues and characterization requirements should be achievable if the SNF is Direct Disposed

NEXT STEPS:

- Establish DOE's position on disposal of uncanistered (bare) SNF
- Refine cost estimate for implementation of Direct Disposal in Standardized Canisters